

Sporotrichosis – cat as the source of familiar infection outbreak in Guarulhos, São Paulo: a case report

Esporotricose – gato como fonte de infecção em foco epidêmico familiar em Guarulhos, São Paulo: relato de caso

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Abstract

Sporotrichosis is a dermatozoonosis caused by fungi of the *Sporothrix* genus. It is classified as an implantation mycosis. This fungal infection, with anthroponotic and saprozonotic characteristics and which has domestic felines, soil, and vegetables as main sources of infection, has been responsible for epizootic and epidemic outbreaks in southern and southeastern Brazil. This report presents the case of a feline diagnosed and treated for sporotrichosis at Dermatology Service of FMVZ/USP, after referral from the Dermatology Department of EPM/Unifesp, where the owners of the cat were being treated for human sporotrichosis.

Keywords: Sporotrichosis. Zoonosis. Dermatology. Cat. Ergodermatosis.

Resumo

A esporotricose é uma dermatozoonose que tem como agentes etiológicos fungos do gênero *Sporothrix*. É responsável por quadros micóticos ditos de implantação. Essa micose, de características antroponóticas e saprozonóticas e cujas principais fontes de infecção são os felinos domésticos, o solo e os vegetais, tem sido responsável por surtos epizooticos e epidêmicos no sul e sudeste brasileiro. Este relato apresenta o caso de um felino diagnosticado e tratado para esporotricose pelo Serviço de Dermatologia do Hospital Veterinário da FMVZ/USP, após ter sido encaminhado pelo Departamento de Dermatologia da EPM/Unifesp, onde os proprietários do animal estavam sendo tratados para esporotricose humana.

Palavras-chave: Esporotricose. Zoonose. Dermatologia. Gato. Ergodermatose.

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Sporotrichosis (Schenck's disease, "maladie de vacance", veterinarians' disease, gardener and florist disease) is included in the group of so-called implantation or intermediate mycoses, characterized by work-related dermatozoonosis (ergodermatosis), caused by infection by the dimorphic fungus of the genus

Sporothrix. It is a dermatitis with anthroponotic or saprozonotic characteristics, and the main sources of infection are domestic cats, soil, and vegetables (QUEIROZ-TELLES et al., 2011).

It is important to emphasize that the role of the cat in this epizootic and epidemic scenario is a direct reflection of its innate, sexual, predatory, and territorial habits (CROWELL-DAVIS, 2007), associated with the erroneous management of their owners, so that these animals often have access to the outside and are not subjected to sterilization (LARSSON, 2011).

Clinically it encompasses localized, mucocutaneous, cutaneous-lymphatic, or disseminated forms, which involves dissemination to distant organs and tissues apart from the integument (LARSSON et al., 1989).

If one suspects of Schenck's disease, it is mandatory to perform diagnostic tests in order to differentiate from similar diseases, which are included in the mnemonic MALSCN, which stands for cutaneous Mycobacteriosis, Algal Diseases (Algis), Leishmaniasis, Sporotrichosis, Cryptococcosis, Neoplasia, and Nocardiosis. Sporotrichosis manifests itself in tegumentum, as solid formations (papule, nodule, or gumma), as well as with tissue loss and regeneration (erosion, ulceration, fistula, and crust). The disease can also present with lymphadenomegaly and lymphadenitis, with the latter ascending from the primary lesion (sporotrichoma), thus generating the classic tegumentary feature of "sporotrichotic rosary"

The diagnosis is based on the data collected from anamnesis and the physical and dermatological examinations, and it is complemented by cytological findings, mycological culture, and histopathological examination.

Sporotrichosis was first reported in Baltimore, USA, in 1898, and in São Paulo, Brazil, in 1907 (LACAZ et al., 2002). Since the 1990s, there have been significant epizootic and epidemic outbreaks in the states of Rio de Janeiro, São Paulo, Paraná, and Rio Grande do Sul. In São Paulo, especially in the eastern and northern areas of the city and in the municipalities of Guarulhos and Diadema, the disease prevalence increased, thus alerting clinicians and public health agencies (SILVA et al., 2015).

The first feline case of sporotrichosis in the Veterinary Hospital of FMVZ/USP (detected in 1984) involved

zoonotic transmission to the owners, veterinary clinicians, and auxiliaries (LARSSON et al., 1989). Since then, there has been an increase in the disease prevalence. In many of these cases, once the diagnosis was established, the owners of the cats were referred to hospitals where they had the same diagnosis confirmed, thus tracing the source of animal infection. For a long time, a correlation with affected felines had not been determined; thus, the etiology of the disease was attributed to contact with vegetables and/or soil (LARSSON, 2016).

Recently, however, a request from the Department of Dermatology of EPM/Unifesp was received by the Dermatology Service (SD) of HOVET/USP, with the referral of a feline case with a presumptive sporotrichosis diagnosis, in order to perform the diagnosis and treatment of a feline infected by contact and owned by infected human patients already under therapy protocol with itraconazole.

A one-year-old male domestic shorthair and outdoor cat weighing 4.1 kilograms, raised in an area of social exclusion in the municipality of Guarulhos, was sustained by a family comprising two adults and two teenagers. Another cat from the same household and with the same skin problem was recently euthanized, diagnosed with disseminated sporotrichosis at the Center for Zoonoses Control (CCZ) of that Municipality. The feline had presented nodular ulcerated and necrotic lesions on the locomotor limbs for two months (Figures 1 and 2).



Figure 1 – Ulcerated lesion, surrounded by hematic crusts on the ventral region of the left forelimb of a feline with sporotrichosis. Dermatology Service of FMVZ-USP, São Paulo/SP (2016)



Figure 2 – Ulcerated necrotic nodular lesion with associated onychomadesis on the first digit of the right hindlimb of the feline with sporotrichosis. Dermatology Service of MVZ-USP, São Paulo/SP (2016)

According to data gathered in the anamnesis, both animals came from a “pet store” in Guarulhos. The euthanized cat presented, after a territorial fight, severe evolution of ulcerated papulonodular lesions, and had not undergone any therapy. In contrast, the feline patient that presented similar lesions was already under treatment with itraconazole provided by the Center for Zoonoses Control (CCZ) of Guarulhos. Food management was based on commercial diets and periodically beef or fish-based commercial diets. Previous immunization or deworming was denied.

The clinical condition initially presented as an injury on the right forelimb, due to a cut from a broken glass [sic], which later evolved to lesions on the right and left hindlimbs. There was detectable satellite lymphadenomegaly. In a female feline in contact, of also indefinite breed, no lesions occurred.

Vital signs remained unchanged, and appetite and thirst were preserved. No other changes were detected in the other organic systems examined.

After submission to usual protocol of general anesthesia of the animal, an incisional biopsy of the cutaneous lesions was performed in order to obtain material for culture and histopathological analysis and the imprint of the lesions for cytological evaluation (Figure 3), and claws’ decal of the forelimbs was also performed in Sabouraud Agar containing plate with and without actidione. Material from the oral cavity was also collected with a sterile swab and added to Sabouraud Agar.

The mycological examination was carried out at the Laboratory of Pathogenic Fungi of ICB/USP. Then, histopathological analysis was performed at the Paulista Laboratory of Dermatopathology.

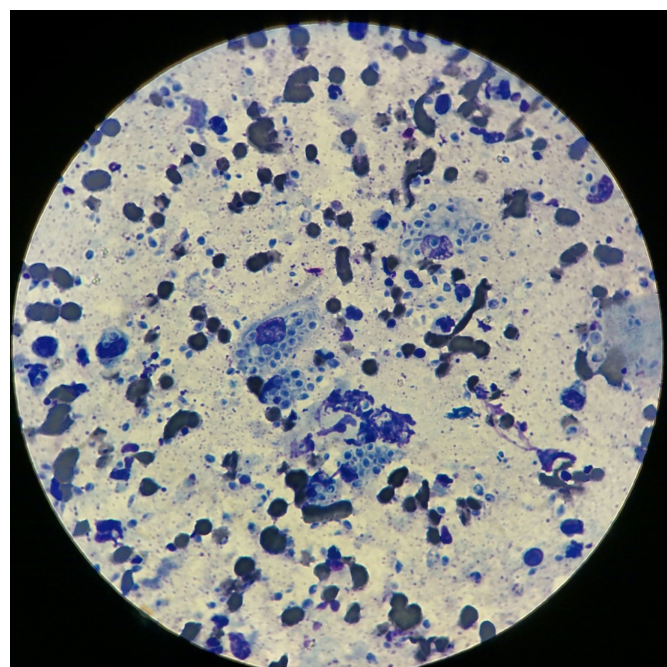


Figure 3 – Cytology of material collected from the ulcerated lesion of limbs after imprint for evaluation. Note the presence of extracellular yeast-like structures and phagocytosed spore-like structures in the macrophages (Fast Panoptic). Dermatology Service of VCM FMVZ-USP, São Paulo/SP (2016)

The results obtained from the collected material, subjected to mycological examination of the integument

(fungoscopic and culture), as well as the material derived from the oral cavity and the imprinted claws were positive for the presence of the fungus of the genus *Sporothrix spp.*, whose definitive characterization was made by polymerase chain reaction, confirming *Sporothrix brasiliensis* species. DNA was extracted and purified from fungal mycelial colonies using lysing enzyme *Trichoderma harzianum* (L-1412, Sigma). The final DNA was solubilized in TRIS-EDTA solution and the quantification of DNA samples was performed in a Nanodrop 1000 spectrophotometer (Thermo Fisher, USA) with absorbance measurements at wavelengths of 260 nm and 280 nm to estimate the purity of the extracted material. The calmodulin locus region was amplified directly from the genomic DNA by PCR using the degenerate primers CL1 (5'-GAR TWC AAG GAG GCC TTC TC-3') and CL2A (5'-TTT TTG CAT CAT GAG TTG GAC-3'), which generated an 800-bp amplicon (RODRIGUES et al., 2013). The amplification products were purified using the Wizard®SV Gel and PCR Clean-up System (Promega) according to the manufacturer's protocol and subsequently subjected to the sequencing reactions in the ABI 3500 DNA Analyzer (Thermo Fisher). The sequences

were analyzed using the software Sequence Scanner v2.0 (Thermo Fisher) and aligned with the Clustal program. The consensus nucleotide sequences obtained were compared to the sequences of reference *S. brasiliensis* strains available from the GenBank (<http://www.ncbi.nlm.nih.gov>) and MycoBank (<http://www.mycobank.org>).

The histopathological examination of the biopsied fragments, subjected to the classic stains hematoxyline and eosine (HE) and periodic acid of Schiff (PAS), revealed skin with intact epidermis and dermis having diffuse inflammatory infiltrates composed almost exclusively of macrophages containing a large number of fungi, with intra and extracellular spores that had a characteristic feature suggestive of *Sporothrix spp.*

Once the diagnosis of sporotrichosis was established, treatment with itraconazole was started at a dose of 45 mg once daily *per os*.

The animal was treated in an inconsistent manner for about four months, due to the difficulty of the drug intake because of the patient's irascibility. Its clinical condition, unfortunately, did not improve. The animal was collected by the CCZ of the municipality of Guarulhos then euthanized.



Figures 4 and 5 – Papulonodular ulcerated lesions on the left upper limb, during the remission phase in a patient (EFS, male, 42 years old), who had contact with a feline with sporotrichosis, and received itraconazole therapy by EPM/UNIFESP. Dermatology Service of FMVZ-USP, São Paulo/SP (2016)

The human family that cared for the feline patient consisted of two adults (EFS, male, 42 years old, unemployed; ED, female, 33 years old, nursing assistant) and two teenage daughters, who were students (GDS, 15 years old; SDS, 16 years old). Three of the human contacts (EFS, GDS, and SDS) presented papulonodular lesions, evolving to ulcerated nodular lesions, and EFS

had a lymphangitis on the upper limb (Figures 4 and 5), abdomen, and back. Both daughters were given a diagnosis of venereal disease, presumably *Molluscum contagiosum*, at the first medical consultation, in a basic health center, which is a parapoxvirus disease that affects atopic children or adults. It can also be sexually transmitted, occurring in 10% to 20% of HIV-positive patients (SAMPAIO; RIVITTI,

2007) and, when found in non-atopic infants, may be an indicative finding of sexual abuse. The patient EFS was then treated with injectable penicillin G (benzathine). The diagnosis of “venereal disease” in the young daughter (GDS) had also been suspected when the onset of lesions on the lower limb occurred a few days later. However, the diagnosis was questioned because the younger of the teenage girls had no prior sexual exposure. This led to the consultation at the Department of Dermatology of the EPM/Unifesp where the presence of lesions in the palm of the hand of SDS was also observed. All of them, with the exception of their mother, who was not showing any lesions, underwent triazole therapy for approximately eight months. Only the father (EFS) reported an adverse reaction manifesting as stomachache and dyspepsia.

Prior to the therapy, the affected patients underwent general and dermatological clinical examination, with material collected for cytological, mycological, and histopathological examination, which confirmed the diagnosis of sporotrichosis.

After the full course of itraconazole therapy, full lesion remission was confirmed and the medical release of the three human patients was proposed.

Sporotrichosis is a disease of zoonotic potential whose transmission to humans through domestic cats is not exclusive through scratching, as is routinely suggested, being the contact with sick animals a sufficient condition for this transmission pathway (BARROS et al., 2001).

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- Treatment with itraconazole *per os* at a dose of 10 mg/kg once a day is the recommended treatment for feline sporotrichosis (LLORET et al., 2013), however the inconstancy of administration due to the animal's temperament may have been a determinant factor for therapy failure.
- The *Molluscum contagiosum* is not a differential diagnosis of sporotrichosis in humans (SAMPALIO; RIVITTI, 2007), although both diseases may share a clinical presentation with papule nodular lesions. Much is discussed about the indicative of sexual abuse of *Molluscum contagiosum* when present in children, especially when in genital or non-typical location, as well as its associated occurrence in cases of proven sexual abuse (BARGMAN, 1986; JAIN, 2004; MENDIRATTA et al., 2014).
- The data obtained from the complementary examinations and epidemiological review, as well as from the symptomatology shared by the animal and its handlers, established a strong causal nexus, proving the zoonotic transmission of sporotrichosis in the home environment, revealing the importance of the awareness about this unknown grievance by the population in general.
- The sporotrichosis control presents a challenge because, in general, the susceptible human cases are from the low-income population, living in precarious hygienic-sanitary conditions, with close proximity to wandering animals. Thus, multimodal interventions regarding social assistance, and medical and veterinary care are necessary.
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